

REMARKS/ARGUMENTS

The Non-Final Office Action dated July 15, 2010 ("Office Action"), has been received and carefully considered. In this response, claims 1, 3-5, 8, and 21 have been amended. No new matter has been added. Entry of the amendments to claims 1, 3-5, 8, and 21 is respectfully requested. Reconsideration of the outstanding objection/rejections in the present application is also respectfully requested based on the following remarks.¹

I. THE OBJECTION TO CLAIMS 1, 3-5, 8, AND 21

On pages 2-5 of the Office Action, claims 1, 3-5, 8, and 21 were objected because of minor informalities. Regarding claims 1, 3-5, 8, and 21 Applicant has amended claims 1, 3-5, 8, and 21, thus renders the aforementioned objection moot. Accordingly, Applicant respectfully requests that the Office withdraws the objection to claims 1, 3-5, 8, and 21.

II. THE INDEFINITENESS REJECTION OF CLAIMS 1-9 AND 21

On page 5 of the Office Action, claims 1-9 and 21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the invention.

Regarding claim 1, it appears that the Office is of the opinion that the limitation "conditioning and pre-melting" is indefinite for failing to particularly point out and distinctly claim the invention. Applicant respectfully disagrees. Applicant submits that one of ordinary

¹ As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicant's silence as to assertions made by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., assertions regarding dependent claims, whether a reference constitutes prior art, whether references are legally combinable for obviousness purposes) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such in the future.

skilled in the art would appreciate that in preparing layers of glass paste containing glass particles and an organic solve, a required by claim 1, after completion of mixing the constituents of the glass paste, printing a layer on a substrate, the following steps may take place:

1. drying the base film at approximately 110°C for a period of time, and
2. reducing a weight percentage of the binder resin (e.g., by binder burnout) at approximately 350°C.

In particular, a copy of Ferro Corporation ("Ferro") dated October, 2007, titled "Hybrid Microcircuit Materials," demonstrates that this principle was well known in the art.

Furthermore, U.S. Patent No. 6,046,121 to Masuko et al. ("Masuko") discloses the above stated principle. In particular, Masuko discloses that the drying process of the film prepared from glass and an organic solvent having a drying temperature of approximately 110°C. *See, e.g.,* Masuko, column 2, lines 39-42. Masuko also discloses that the removal of the binder and the baking of the film on the glass substrate. *See, e.g.,* Masuko, column 7, lines 17-24; and column 14, lines 19-26. Thus, Masuko further demonstrates that the conditioning (e.g., drying and binder burnout) principle is well know in the art. In addition, the premelting step is defined in the present disclosure. *See, e.g.,* present disclosure, paragraph [0028]. Therefore, one of ordinary skilled in the art would appreciate that the conditioning and premelting comprises drying or binder burnout as well as premelting.

Accordingly, Applicant respectfully requests that the aforementioned indefiniteness rejection of claims 1-9 and 21 be withdrawn.

III. THE OBVIOUSNESS REJECTION OF CLAIMS 1-8 AND 21

On page 9 of the Office Action, claims 1-8 and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,094,969 to Warren ("Warren") in view of

U.S. Patent No. 5,545,912 to Ristic *et al.* ("Ristic") and further in view of U.S. Patent No. 6,817,917 to Kado *et al.* ("Kado"). This rejection is hereby respectfully traversed.

Under 35 U.S.C. § 103, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. In re Fine, 837 F.2d 1071, 1074 (Fed. Cir. 1988). There are four separate factual inquiries to consider in making an obviousness determination: (1) the scope and content of the prior art; (2) the level of ordinary skill in the field of the invention; (3) the differences between the claimed invention and the prior art; and (4) the existence of any objective evidence, or "secondary considerations," of non-obviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966); see also KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727 (2007). An "expansive and flexible approach" should be applied when determining obviousness based on a combination of prior art references. KSR, 127 S. Ct. at 1739. However, a claimed invention combining multiple known elements is not rendered obvious simply because each element was known independently in the prior art. Id. at 1741. Rather, there must still be some "reason that would have prompted" a person of ordinary skill in the art to combine the elements in the specific way that he or she did. Id.; In re Icon Health & Fitness, Inc., 496 F.3d 1374, 1380 (Fed. Cir. 2007). Also, modification of a prior art reference may be obvious only if there exists a reason that would have prompted a person of ordinary skill to make the change. KSR, 127 S. Ct. at 1740-41.

Regarding claim 1, the Office Action asserts that the claimed inventions would have been obvious in view of Warren, Ristic, and Kado. Applicant respectfully disagrees. Applicant submits that neither the cited portions of Warren, Ristic, and Kado, nor Warren, Ristic, and Kado generally, disclose, or even suggest, "joining the at least two processed semiconductor wafers at a first processing temperature of the electrically non-conducting glass paste and at a second processing temperature of the electrically conducting glass paste using a mechanical pressure," as currently recited in claim 1. In particular, the present disclosure discloses that screen printing,

conditioning and pre-melting of the electrical non conductive glass paste in paragraphs [0028] and [0029]. Also, the present disclosure discloses that screen printing, conditioning and pre-melting of the electrically conductive glass paste (e.g., second type of layer) in paragraphs [0030] and [0031]. Further, the present disclosure discloses the bonding at the processing temperature (firing) of the glass in paragraph [0033]. Thus, the non-conductive glass layer as well as the conductive glass layer are affected by the firing (baking) of the layers. For example, the firing (baking) of the layers not only finalizes the process of producing the layers but also has the effect that the layers on the two substrates are bonded to each other.

Warren, Ristic, and Kado, taken either alone or in combination, fail to disclose, or even suggest, "joining the at least two processed semiconductor wafers at a first processing temperature of the electrically non-conducting glass paste and at a second processing temperature of the electrically conducting glass paste using a mechanical pressure," as currently recited in claim 1. In particular, Warren refers to a substrate that is formed from a core substrate out of flexible, low-temperature, co-fireable ceramic tape and an outer substrate of ceramic tape, the core substrate having apertures for inserting integrated circuit therein. The substrate is heated to form a rigid body which then mounts the integrated circuits (ICs). The rigid body and the ICs are covered or at least partly covered with an insulating glass and heated to a temperature that fuses the glass to hermetically seal the substrate in a single structure. *See, e.g.,* Warren, Abstract. Thus, Warren fails to disclose, or even suggest a process for connecting processed semiconductor wafers where the processed semiconductor wafers include circuit elements which are to be completed to electrical circuits upon bonding of the layers attached to the two processed semiconductor wafers upon having aligned the wafers and firing the glass paste layers to affect the bonding of the two processed semiconductor wafers. In contrast, an embodiment of the present disclosure discloses that upon joining the at least two processed semiconductor wafers at

a processing temperature of the electrically non-conducting glass paste and the electrically conducting glass paste using a mechanical pressure not only affects joining of the two processed wafers but also the completion of the circuitry included in the two processed wafers.

Furthermore, an embodiment of the present disclosure refers to another integration level as compared to Warren. In particular, Warren discloses preparing a substrate out of several layers of flexible low-temperature ceramic tape and an outer substrate cover (which has no electrical purpose at all). In contrast, an embodiment of the present disclosure refers to the connection of processed wafers (e.g., to a level of manufacturing the integrated circuit chips as they are used in Warren and inserted into the substrate). The integration of circuit boards like the substrates of Warren with electrical circuits is another integration level and has nothing to do with completing an integrated circuit chip by joining two processed wafers in the way as claimed by the present application. Moreover, Warren only discloses connecting ceramic tape layers to each other and inserting integrated circuits into recesses provided in the substrate formed by connecting ceramic tape layers. The electrically insulating connections and the electrically conductive connections are not provided by the bonding layers but by separate measures like forming and filling vias in the substrate.

The Office acknowledges that the substrate of Warren is not a wafer and relies on Ristic to remedy the deficiencies of Warren. However, Ristic is an example of the state of the art that is intended to be improved by the present application. Specifically, Ristic discloses that the wafers are, at first, mechanically processed and thereafter bonded in an electrically insulating way by means of layer 14. Also, Ristic discloses a bonding wire that is applied in order to put the cover on mass level. Therefore, the cover 16 has only the function of electrically shielding the circuitry on substrate 12. The cover 16 of Ristic cannot be interpreted as a processed wafer because cover 16 does not contain any circuitry. Because there is no circuitry in the cover 16, no circuitry can

be connected to any circuitry located on substrate 12 of Ristic. Therefore, completion of an electric circuitry being designed partly on each of the two layers which are combined according to an embodiment of the present disclosure, is not possible in Ristic. In addition, the electronic device 26 of Ristic has not counterpart. Thus, the combination of Warren and Ristic fail to disclose, or even suggest, the present claimed invention.

Further, the Office asserts that Kado discloses pre-baking of glass paste at 350°C. However, an embodiment of the present disclosure is directed to prepare two wafers, cover them with electrically conductive and electrically nonconductive layers in particular patterns and joining the two wafers with their respective layers in a final processing step which not only joins the two wafers by bonding but also completes the electrical circuitry contained on the two processed wafers. Thus, the combination of Warren, Ristic and Kado fails to disclose each and every claimed limitations recited in independent claim 1.

Regarding claims 2-8, these claims are dependent upon independent claim 1. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071 (Fed. Cir. 1988). Thus, since independent claim 1 should be allowable as discussed above, claims 2-8 should also be allowable at least by virtue of their dependency on independent claim 1. Moreover, these claims recite additional features which are not disclosed, or even suggested, by the cited references taken either alone or in combination.

In view of the foregoing, Applicant respectfully requests that the aforementioned obviousness rejection of claims 1-8 be withdrawn.

IV. THE OBVIOUSNESS REJECTION OF CLAIM 9

On page 17 of the Office Action, claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Warren in view of Ristic and further in view of Kado and further in view of

U.S. Patent Application Publication No. 2003/0170936 to Christensen. This rejection is hereby respectfully traversed.

Applicant respectfully submits that the aforementioned obviousness rejection of claim 9 has become moot in view of the deficiencies of the primary references (i.e., Warren, Ristic, and Kado) as discussed above with respect to independent claim 1. That is, claim 9 is dependent upon independent claim 1 and thus inherently incorporates all of the limitations of independent claim 1. Also, the secondary reference (i.e., Christensen) fails to disclose, or even suggest, the deficiencies of the primary references as discussed above with respect to independent claim 1. Indeed, the Office Action does not even assert such. Thus, the combination of the secondary reference with the primary references also fails to disclose, or even suggest, the deficiencies of the primary references as discussed above with respect to independent claim 1. Accordingly, claim 9 should be allowable over the combination of the secondary reference with the primary references at least by virtue of its dependency on independent claim 1. Moreover, claim 9 recites additional features which are not disclosed, or even suggested, by the cited references taken either alone or in combination.

V. CONCLUSION

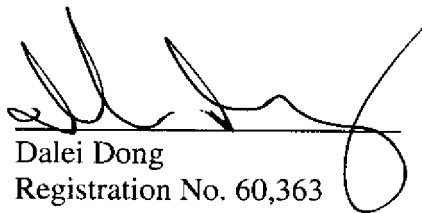
In view of the foregoing amendments and arguments, Applicant respectfully submits that this application is now in condition for allowance. If the Examiner believes that prosecution and allowance of the application will be expedited through an interview, whether personal or telephonic, the Examiner is invited to telephone the undersigned with any suggestions leading to the favorable disposition of the application.

It is believed that no fees are due for filing this Response. However, the Director is hereby authorized to treat any current or future reply, requiring a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. Applicant also authorizes the Director to charge all required fees, fees under 37 C.F.R. §1.17, or all required extension of time fees, to the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,

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